

**Preliminary Assessment Report
Orange County North Basin
Orange County, California**

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List of Acronyms

µg/L	micrograms per liter
3DVA	3-Dimensional Visualization and Analysis
ASTM	ASTM International
bgs	below ground surface
BPWD	City of Buena Park Water Department
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COWD	City of Orange Water Division
DCE	dichloroethylene
DTSC	California Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
GIS	geographic information system
GSWC	Golden State Water Company
HQ	Headquarters
HRS	Hazard Ranking System
MCL	Maximum Contaminant Level
MWD	Metropolitan Water District of Southern California
NBGPP	North Basin Groundwater Protection Project
NPL	National Priorities List
OCNB	Orange County North Basin
OCWD	Orange County Water District
PA	Preliminary Assessment
PCE	tetrachloroethylene
RCRAInfo	Resource Conservation and Recovery Act Information System
RWQCB	Santa Ana Regional Water Quality Control Board
SEMS	Superfund Enterprise Management System
SI	Site Inspection
TCE	trichloroethylene
VOC	volatile organic compound
WESTON®	Weston Solutions, Inc.
YLWD	Yorba Linda Water District

1.0 INTRODUCTION

1.1 Regulatory Background

Under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Weston Solutions, Inc. (WESTON®) has been tasked to conduct a Preliminary Assessment (PA) of the Orange County North Basin (OCNB) site in Orange County, California.

The purpose of a PA is to review existing information on a site with potential releases of a hazardous substance and its environs to assess the threats, if any, posed to public health, welfare, or the environment and to determine if further investigation under CERCLA is warranted. The scope of a PA generally includes review of existing information available from federal, state, and local agencies.

Using existing information sources, a site is then evaluated using the U.S. Environmental Protection Agency's (EPA) Hazard Ranking System (HRS) criteria to assess the relative threat associated with actual or potential releases of hazardous substances at the site. The HRS has been adopted by EPA to help set priorities for further evaluation and eventual remedial action at hazardous substance sites. The HRS is the primary method of determining a site's eligibility for placement on the National Priorities List (NPL). The NPL is a list compiled by EPA of uncontrolled hazardous substance releases in the United States that are priorities for long-term remedial evaluation and response. This report summarizes the findings of these preliminary investigative activities.

The OCNB site was identified as a potential hazardous waste site and entered into the Superfund Enterprise Management System (SEMS) (SEMS ID No.: CAN000900251) (EPA, 2016a).

More information about the Superfund program is available on the EPA website at http://www.epa.gov/superfund/programs/npl_hrs/siteasmt.htm.

1.2 Apparent Problem

EPA determined that a PA was needed at the OCNB site because of the following apparent problems:

- Elevated concentrations of hazardous substances, including 1,1-dichloroethylene (1,1-DCE), trichloroethylene (TCE), tetrachloroethylene (PCE), 1,4-dioxane, and perchlorate, have been identified in monitoring wells and drinking water production wells in the northern and central areas of Orange County (Intera, 2015; OCWD, 2015a; OCWD, 2015b; OCWD, 2016).
- At least 46 active drinking water production wells are located within 4 miles of this groundwater plume. 1,1-DCE, TCE, PCE, 1,4-dioxane, and perchlorate have been detected in many of these wells (OCWD, 2016).

2.0 SITE DESCRIPTION

2.1 Site Location and Description

The OCNB site is located in northern Orange County, California. The site consists of a volatile organic compound (VOC) groundwater plume covering approximately 5 square miles located northwest of the intersection of the CA-57 and CA-91 Freeways. The geographic coordinates for the site are 33° 51' 50.24" North latitude and 117° 54' 37.89" West longitude (OCWD, 2016) (Appendix A). This corresponds with the location of Orange County Water District (OCWD) Principal aquifer monitoring well F-10, which is in the approximate center of the plume. The location of the site is shown in Figure 1.

2.2 Operational History

The OCNB site consists of a VOC-contaminated groundwater plume, which is contaminated by known and unknown industrial sources located in the OCNB plume area. Chlorinated organic solvents such as TCE and PCE are common industrial chemicals that are typically associated with cleaning and degreasing operations.

Several known sources of VOCs to the groundwater plume are currently being remediated by the Santa Ana Regional Water Quality Control Board (RWQCB) and the California Department of Toxic Substances Control (DTSC) Cypress Office. EPA also assessed several possible additional sources in separate PAs. This PA is focused only on the groundwater plume with known and unknown sources.

2.3 Regulatory Involvement

2.3.1 U. S. Environmental Protection Agency (EPA)

The OCNB site is not listed in the Resource Conservation and Recovery Act Information System (RCRAInfo) database as of April 2016 (EPA, 2016b).

DTSC and RWQCB have been conducting investigations and remedial activities at multiple facilities located within the OCNB plume. These agencies requested EPA assistance in evaluating the plume and possible sources of contaminants to the plume. On behalf of EPA, DTSC conducted EPA Site Screens on 11 facilities located within the plume. Based on the results of the Site Screens, EPA completed HRS PAs at eight of these facilities that were identified as possible sources to the plume. EPA recommended no further action at the remaining three sites. Based on the results of the PAs, seven of these eight PA sites will be described in the OCNB Site Inspection (SI) report as possible sources to the OCNB plume. A PA was also completed on behalf of EPA on one additional site (Orange County Metal Processing), which is currently being remediated under DTSC oversight. The sites assessed by EPA are listed in Table 1 and are presented in Figure 1.

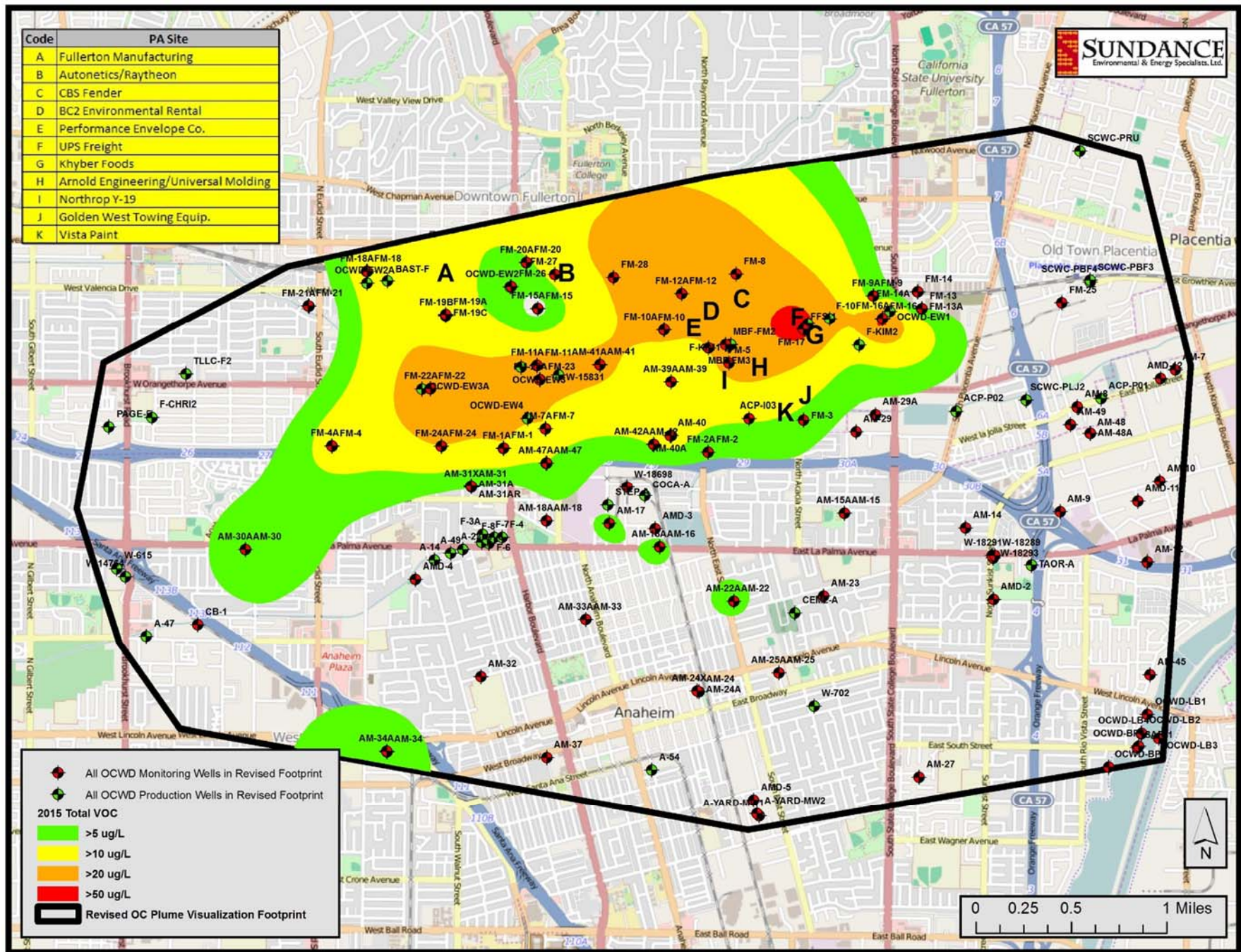


Figure 1: Orange County North Basin Plume with Monitoring and Production Wells and EPA 3DVA Plume Map

Table 1: OCNB Sites with EPA PAs

Site Name	Address
Arnold Engineering	1551 East Orangethorpe Avenue, Fullerton, CA
Autonetics – Raytheon	310 East Walnut Avenue, Fullerton, CA
CBS/Fender	500 South Raymond Avenue, Fullerton, CA
Fullerton Manufacturing/Raytheon	311 South Highland Avenue, Fullerton, CA
Golden West Towing Equipment	1850 East Orangethorpe Avenue, Fullerton, CA
Khyber Foods	1818 East Rosslynn Avenue, Fullerton, CA
Northrop (Y-19)	1401 East Orangethorpe Avenue, Fullerton, CA
Vista Paint	2020 East Orangethorpe Avenue, Fullerton, CA
Orange County Metal Processing	1711 East Kimberly Avenue, Fullerton, CA

As part of the OCNB plume investigation, EPA’s contractor has developed a Conceptual Site Model of the plume using the 3-Dimensional Visualization and Analysis (3DVA). The 3DVA includes geology, hydrogeology, and groundwater contaminant chemistry “components” that are integrated to develop the final 3-D visualizations, using C Tech Corp.’s Earth Volumetric Studio visualization and analysis software, ArcGIS, and Sundance proprietary codes (Sundance is the subcontractor to ICF International, the mission contractor to EPA Headquarters [HQ] Superfund Program). Figure 1 was generated using the Sundance 3DVA database (Sundance, 2017).

The lithology database from OCWD was used as the data source for the geology component, including a total of 122 lithology logs. Hydrogeology data included the spatial configuration of the Shallow and Principal aquifers horizontal and vertical extents obtained from geographic information system (GIS) top and bottom aquifer surface maps. Water level measurements compiled from GeoTracker and OCWD were used to generate annual maximum water table surfaces and 3-D hydraulic head distributions. Groundwater contaminant chemistry data include data from 2012 to 2016 from GeoTracker and OCWD (OCWD, 2015b; Sundance, 2017).

2.3.2 State of California

DTSC and RWQCB have been conducting investigations and remedial activities at multiple facilities located within the OCNB plume. In addition to the nine facilities assessed by EPA listed in Table 1, DTSC and RWQCB are currently conducting remedial activities at nine possible source sites (three for DTSC, and six for RWQCB), including one site also assessed by EPA (Tables 2 and 3).

Table 2: RWQCB-Lead OCNB Sites

Site Name	Address
AC Products	172 La Jolla St., Placentia
Aerojet (part of the site has been split into a separate site named Fullerton Crossings Development)	601 South Placentia, Fullerton
Alcoa Fastening Systems	800 S. State College Blvd., Fullerton
Monitor Plating	800 Orangefair Lane, Anaheim
Northrop (Kester Solder)	1730 North Orangethorpe Park, Anaheim
Northrop Y-12 (current name Hot Rods LLC)	301 E. Orangethorpe Ave., Anaheim

Table 3: DTSC-Lead OCNB Sites

Site Name	Address
Chicago Musical Instruments/F.E. Olds	350 S. Raymond Ave, Fullerton
Orange County Metal Processing	1711 East Kimberly, Fullerton
PCA Metal Finishing	1726 East Rossllyn Avenue, Fullerton

2.3.3 Orange County Water District

OCWD is the Water District managing the Orange County Groundwater Basin. Water from the basin provides approximately 70 percent of the water supply for 2.4 million residents in Orange County. OCWD conducts comprehensive water quality monitoring programs to manage the groundwater basin and to comply with permits and drinking water regulations for the water agencies in Orange County, including the Federal Safe Drinking Water Act and California Title 22 water quality monitoring for drinking water production wells. As part of this program, OCWD collects water elevation and water quality data from nearly 700 wells, including over 400 OCWD-owned monitoring wells (OCWD, 2015a).

The OCWD groundwater monitoring program resulted in the discovery of the OCNB VOC plume. OCWD is currently monitoring this plume as part of their North Basin Groundwater Protection Project (NBGPP). The NBGPP was initiated in 2005 to minimize the spread of VOC contamination and clean up the groundwater in this portion of the basin. OCWD has installed over 200 groundwater monitoring wells as part of the NBGPP to aid in monitoring the migration and extent of VOCs in the Shallow and/or Principal aquifers. Based on groundwater monitoring data, OCWD has concluded that VOCs are migrating from the Shallow Aquifer into the Principal aquifer, which is used for drinking water. Four drinking water wells within the footprint of the existing plume were destroyed because of contamination (two from City of Fullerton, one from City of Anaheim, and one private well) (Intera, 2015; OCWD, 2015a; OCWD, 2015b; OCWD, 2016).

3.0 INVESTIGATIVE EFFORTS

As part of the NBGPP, OCWD collects water elevation and water quality data from monitoring wells and drinking water production wells in the OCNB site area. Groundwater samples are collected from OCWD monitoring wells approximately quarterly. Groundwater sampling is conducted in accordance with ASTM International (ASTM) protocols or their functional equivalent (*ASTM D4448 - 01(2013), Standard Guide for Sampling Ground-Water Monitoring Wells*). OCWD operates its own laboratory that is state-certified to perform bacteriological, inorganic, and organic analyses (Intera, 2015; OCWD, 2015a; OCWD, 2015b; OCWD, 2016).

Groundwater samples collected by OCWD from monitoring and production wells are analyzed for VOCs via EPA Method 524.2. Well locations are presented in Figure 1. The VOC plume contours in Figure 1 were developed using 3DVA based on OCWD sampling data collected from these monitoring and production wells in 2015. Recent analytical results from selected OCWD Principal aquifer monitoring wells are presented in Table 4 (OCWD, 2016).

4.0 HAZARD RANKING SYSTEM FACTORS

4.1 Sources of Contamination

For HRS purposes, a source is defined as an area where a hazardous substance has been deposited, stored, disposed, or placed, plus those soils that have become contaminated from migration of a hazardous substance.

- The Orange County North Basin site consists of a VOC groundwater plume, but the contamination cannot be clearly attributed to any specific source. VOC contamination originated from numerous industrial sources located in the Orange County North Basin plume area, including multiple facilities that have known releases to groundwater. Chlorinated organic solvents such as TCE and PCE are common industrial chemicals that are typically associated with cleaning and degreasing operations (Intera, 2015; OCWD, 2015a).
- EPA is currently assessing nine facilities as possible sources contributing to the VOC groundwater plume. These facilities are presented in Table 1 and Figure 1. One of these facilities is among the three facilities currently being remediated by DTSC. An additional eight facilities (Tables 2 and 3) are currently being remediated with DTSC or RWQCB oversight.

4.2 Groundwater Pathway

In determining a score for the groundwater migration pathway, the HRS evaluates: 1) the likelihood that sources at a site actually have released, or potentially could release, hazardous substances to groundwater; 2) the characteristics of the hazardous substances that are available for a release (i.e., toxicity, mobility, and quantity); and 3) the people (targets) who actually have been, or potentially could be, impacted by the release. For the targets component of the evaluation, the HRS focuses on the number of people who regularly obtain their drinking water from wells that are located within 4 miles of contaminated monitoring wells associated with the OCNB plume. The HRS emphasizes drinking water usage over other uses of groundwater (e.g., food crop irrigation and livestock watering), because, as a screening tool, it is designed to give the greatest weight to the most direct and extensively studied exposure routes.

4.2.1 Hydrogeological Setting

The Orange County Groundwater Basin covers an area of approximately 350 square miles, bordered on the north by the Coyote and Chino Hills and on the northeast by the Santa Ana Mountains. The basin boundary extends to the Orange County-Los Angeles County line to the northwest, and is bordered on the southwest by the Pacific Ocean and the Newport-Inglewood fault zone (Intera, 2015; OCWD, 2015a).

The Orange County Groundwater Basin aquifer systems extend to depths of over 2,000 feet, and comprise a complex series of interconnected sand and gravel deposits. Towards the coast, the

aquifers are hydraulically separated by lower-permeability aquitards, and groundwater is generally under confined conditions. This region, referred to as the “Pressure Area,” is characterized by shallow clay and silt layers that impede surface and near-surface groundwater from recharging the major producible aquifers. In the inland areas of the basin, the aquitards become thinner and less continuous. This allows downward vertical movement of groundwater from shallow to deep aquifers. This area, referred to as the “Forebay Area,” is characterized by highly permeable sands and gravels with few and discontinuous clay and silt deposits that allow direct percolation of Santa Ana River and other surface water. The OCNB plume is located in the Forebay Area (Intera, 2015).

Three aquifer systems are generally recognized in the basin: the Shallow, Principal, and Deep aquifer systems. In the OCNB site area, the Shallow aquifer is unconfined and consists of poorly consolidated sediments deposited by the Santa Ana River, with discontinuous inter-fingering lenses of gravel, sand, silt, and clay. The Shallow aquifer in the site area extends to a depth of approximately 200 to 250 feet below ground surface (bgs), with the water table ranging from 80 to 120 feet bgs. The Shallow aquifer provides approximately 5% of total basin production (Intera, 2015).

The Principal aquifer system is the primary water-supply aquifer in the region, and accounts for approximately 90% of the municipal groundwater production in the basin. The Principal aquifer consists of unconsolidated, medium- to coarse-grained sands and gravels with interbedded thin lenses of fine-grained, low-permeability silts and clays. The aquitard separating the Shallow aquifer from the Principal aquifer is not continuous within the site area. Although the highest concentrations of VOCs have been detected within the Shallow aquifer, VOCs have been detected within the Principal aquifer at up to 600 feet bgs (Intera, 2015).

The Deep aquifer underlies the Principal aquifer, with the bottom of the aquifer ranging from 1,000 to over 3,000 feet bgs. A relatively thick and continuous aquitard separates the Principal aquifer and the Deep aquifer. The Deep aquifer provides approximately 5% of total basin production (Intera, 2015).

Groundwater flow is generally to the west in the Shallow aquifer, and west and southwest in the Principal aquifer. The hydraulic gradient is locally amplified by production wells extracting water from the Principal aquifer. A downward hydraulic gradient between the Shallow and Principal aquifers allows VOC-impacted groundwater to migrate both laterally and vertically downward, largely in response to pumping-induced gradients (Intera, 2015).

4.2.2 Groundwater Targets

There are at least 46 active drinking water wells within 4 miles of the OCNB plume, and these wells serve an approximate population of 485,000 people. Four drinking water production wells within the footprint of the existing plume were destroyed because of VOC contamination, including two from City of Fullerton (Fire Station No. 13 and Kimberly No. 1), one from City of Anaheim (Well No. 23), and one private well (BAST-F) (Mark, 2016; OCWD, 2016).

A conservative HRS scoring scenario was applied by measuring HRS distance rings from the locations of contaminated OCWD Principal aquifer monitoring wells within the plume, rather than from the 3DVA-calculated boundary of the plume. A contaminated well has at least one hazardous substance at a concentration significantly above background, as defined in Section 4.2.3. Monitoring wells are listed in Table 4, and shown in Figure 1. Two City of Fullerton drinking water production wells (Kimberly No. 2 and Sunclipse No. 10) are located less than 0.25 mile from contaminated monitoring wells within the plume (OCWD, 2016; WESTON, 2016).

The City of Fullerton operates a drinking water system that consists of 11 active wells serving approximately 138,251 people. The City of Fullerton obtains its drinking water from groundwater from the Orange County Groundwater Basin and from surface water imported by the Metropolitan Water District of Southern California (MWD). The City of Fullerton is separated into three areas that are defined by the source of water likely to be provided. Area 1 receives primarily groundwater; Area 2 receives a mixture of groundwater and imported water; and Area 3 receives primarily imported water. All 11 groundwater wells operated by the City of Fullerton are within 4 miles of contaminated Principal aquifer monitoring wells within the plume. PCE, TCE, and/or 1,1-DCE have been detected in eight active City of Fullerton wells (Well Nos. 4, 5, 6, 7, 8, Sunclipse No. 10, Airport Well No. 9, and Kimberly No. 2). City of Fullerton wells Kimberly No. 1 and Fire Station No. 13 were destroyed in 2002 after elevated concentrations of PCE were detected (Fullerton, 2015; GeoTracker, 2016; Mark, 2016; OCWD, 2016; WESTON, 2016).

The City of Anaheim operates a drinking water system that consists of 17 active wells and 1 standby well serving approximately 336,265 people. The City of Anaheim's water supply is a blend of groundwater and surface water imported by MWD. Approximately 76 percent of the system is supplied by groundwater wells; the remaining 24 percent is imported surface water. Fifteen of the 18 wells operated by the City of Anaheim are within 4 miles of contaminated Principal aquifer monitoring wells within the plume. TCE and/or 1,1-DCE have been detected in two of these wells (Well No. 41 and Well No. 47). Well No. 23 was destroyed in 2001 after elevated concentrations of PCE, TCE, and 1,1-DCE were detected (Anaheim, 2015; GeoTracker, 2016; Mark, 2016; OCWD, 2016; WESTON, 2016).

The Golden State Water Company – Placentia system operates a drinking water system that consists of five active wells serving approximately 46,543 people. The Golden State Water Company – Placentia system's water supply is a blend of groundwater and surface water imported by MWD. Approximately 55.3 percent of the system is supplied by groundwater wells; the remaining 44.7 percent is imported surface water. All five wells operated by the Golden State Water Company – Placentia system are within 4 miles of contaminated Principal aquifer monitoring wells within the plume (GeoTracker, 2016; GSWC, 2015; OCWD, 2016; WESTON, 2016; Appendix C-1).

The City of Orange Water Division (COWD) operates a drinking water system that consists of 15 active wells serving approximately 139,463 people. The City of Orange's water supply is a blend of groundwater and surface water imported by MWD. Approximately 71.1 percent of the system is supplied by groundwater wells; the remaining 28.9 percent is imported surface water. Two of

the 15 wells operated by the City of Orange are within 4 miles of contaminated Principal aquifer monitoring wells within the plume (COWD, 2014; GeoTracker, 2016; OCWD, 2016; WESTON, 2016; Appendix C-2).

The Page Avenue Mutual Water Company operates a drinking water system that consists of one active drinking well serving approximately 115 people. All of the Page Avenue Mutual Water Company's water supply is from groundwater. The well operated by Page Avenue Mutual Water Company is within 4 miles of contaminated Principal aquifer monitoring wells within the plume. TCE and 1,1-DCE have been detected in this well (PAGE-F) (GeoTracker, 2016; OCWD, 2016; WESTON, 2016).

The Yorba Linda Water District operates a drinking water system that consists of 10 active drinking water wells serving approximately 77,513 people. The Yorba Linda Water District's water supply is a blend of groundwater and water imported by MWD. Approximately 67 percent of the system is supplied by groundwater wells; the remaining 33 percent is imported surface water. Nine of the 10 wells operated by the Yorba Linda Water District are within 4 miles of contaminated Principal aquifer monitoring wells within the plume (YLWD, 2015; GeoTracker, 2016; OCWD, 2016; WESTON, 2016).

The City of Buena Park system operates a drinking water system that consists of eight active wells serving approximately 82,767 people. The City of Buena Park's water supply is a blend of groundwater and surface water imported by MWD. Approximately 70 percent of the system is supplied by groundwater wells; the remaining 30 percent is imported surface water. Three of the eight wells operated by the City of Buena Park are within 4 miles of contaminated Principal aquifer monitoring wells within the plume (BPWD, 2015; GeoTracker, 2016; OCWD, 2016; WESTON, 2016; Appendix C-3).

4.2.3 Groundwater Pathway Conclusion

A release of hazardous substances to groundwater in the Principal aquifer is projected, based on the results of OCWD's NGBPP sampling program, as discussed in Section 3. The minimum standard to establish an observed release by chemical analysis is analytical evidence of a hazardous substance in the media significantly above the background level. In accordance with Table 2-3 of the HRS, if the background concentration is not detected (or is less than the detection limit), an observed release is established when the sample measurement equals or exceeds the sample quantitation limit. If the background concentration equals or exceeds the detection limit, an observed release is established when the sample measurement is 3 times or more above the background concentration.

Some OCWD sampling results from Principal aquifer monitoring wells within and around the OCNB plume are presented in Table 4. Based on the 3DVA plume map, and with the technical assistance of OCWD and the EPA HQ Superfund Office in charge of NPL listing, wells located within, upgradient, cross-gradient, and downgradient of the plume were identified, where available. Wells screened in the Principal aquifer were identified based on well construction data

provided by OCWD. Background locations within each aquifer were selected to be screened at comparable depths to the contaminated wells within the plume. A contaminated well has at least one hazardous substance at a concentration significantly above background (OCWD, 2016).

Background wells were selected for comparability with contaminated monitoring wells located within the OCNB plume. The background monitoring wells are located east (upgradient) and south (cross-gradient) of the groundwater VOC plume, as identified based on historical OCWD sampling data showing VOC concentrations and groundwater flow directions. According to OCWD, there are no monitoring wells north (cross-gradient) of the plume, or downgradient in proximity to the western leading edge of the plume (OCWD, 2016).

Table 4: Monitoring Well Data Projecting an Observed Release to the Principal Aquifer

Well Name	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Sampling Date	1,1-DCE (µg/L)	TCE (µg/L)	PCE (µg/L)
Background Principal Aquifer Monitoring Wells						
AM-9	285	303	12/1/2015	ND (0.5)	ND (0.5)	ND (0.5)
AM-14	297	315	2/1/2016	ND (0.5)	ND (0.5)	ND (0.5)
AM-25	340	358	6/22/2015	ND (0.5)	0.7	TR
AM-29	340	358	1/22/2015	ND (0.5)	ND (0.5)	ND (0.5)
AM-35	332	350	7/20/2015	ND (0.5)	1.6	2.3
AM-48	270	300	11/2/2015	ND (0.5)	ND (0.5)	ND (0.5)
Contaminated Principal Aquifer Monitoring Wells						
FM-10	215	235	1/21/2016	0.9	9.6	5.7
FM-11	236	256	11/18/2015	1.8	24.7	6.3
FM-12	206	226	11/16/2015	1.3	9.9	6.4
FM-16	248	268	1/18/2016	ND (0.5)	0.7	34.4
FM-17	250	270	1/4/2016	ND (0.5)	5.3	33
FM-19B	230	260	1/25/2016	0.9	15.8	2.8
FM-19C	365	385	1/25/2016	ND (0.5)	TR	21
FM-22	242	262	1/13/2016	3.1	29.9	31.3
FM-23	234	249	1/13/2016	1.6	26	3.7
FM-24	271	291	11/10/2015	1.6	23.6	TR

References: OCWD, 2015b; OCWD, 2016.

bgs: below ground surface

µg/L: micrograms analyte per liter groundwater

ND: not detected above the quantitation limit

TR: trace concentration

There are at least 46 active drinking water production wells screened in the Principal aquifer located within 4 miles of the OCNB plume. These wells are operated by the City of Fullerton, the City of Anaheim, the City of Orange, Golden State Water Company, Page Avenue Mutual Water Company, Yorba Linda Water District, and City of Buena Park. VOCs, including 1,1-DCE, TCE, and PCE, have been detected in several of these drinking water production wells. In addition, two City of Fullerton Wells, one City of Anaheim Well, and one private well located within the plume have been destroyed. Before their destruction, these wells had VOC concentrations exceeding Maximum Contaminant Levels (MCLs) (OCWD, 2016; WESTON, 2016).

4.3 Surface Water Pathway

To determine the score for the surface water pathway, the HRS evaluates: 1) the likelihood that sources at a site actually have released, or potentially could release, hazardous substances to surface water (e.g., streams, rivers, lakes, and oceans); 2) the characteristics of the hazardous substances that are available for a release (i.e., toxicity, persistence, bioaccumulation potential, and quantity); and 3) the people or sensitive environments (targets) who actually have been, or potentially could be, impacted by the release. For the targets component of the evaluation, the HRS focuses on drinking water intakes, fisheries, and sensitive environments associated with surface water bodies within 15 miles downstream of the site.

For HRS purposes, the OCNB site was considered to be a comingled contaminated groundwater plume with multiple known and unknown industrial sources. Based upon this information, hazardous substances associated with the groundwater plume site are not considered under the surface water pathway at this time.

4.4 Soil Exposure and Air Migration Pathways

In determining the score for the soil exposure pathway, the HRS evaluates: 1) the likelihood that there is surficial contamination associated with the site (e.g., contaminated soil that is not covered by pavement or at least 2 feet of clean soil); 2) the characteristics of the hazardous substances in the surficial contamination (i.e., toxicity and quantity); and 3) the people or sensitive environments (targets) who actually have been, or potentially could be, exposed to the contamination. For the targets component of the evaluation, the HRS focuses on populations that are regularly and currently present on or within 200 feet of surficial contamination. The four populations that receive the most weight are residents, students, daycare attendees, and terrestrial sensitive environments.

In determining the score for the air migration pathway, the HRS evaluates: 1) the likelihood that sources at a site actually have released, or potentially could release, hazardous substances to ambient outdoor air; 2) the characteristics of the hazardous substances that are available for a release (i.e., toxicity, mobility, and quantity); and 3) the people or sensitive environments (targets) who actually have been, or potentially could be, impacted by the release. For the targets component of the evaluation, the HRS focuses on regularly occupied residences, schools, and workplaces within 4 miles of the site. Transient populations, such as customers and travelers passing through the area, are not counted.

For HRS purposes, the OCNB site was considered to be a comingled contaminated groundwater plume with multiple known and unknown industrial sources. Based upon this information, hazardous substances associated with the groundwater plume site are not considered under the soil exposure and air pathways at this time.

5.0 REMOVAL EVALUATION CONSIDERATIONS

The National Contingency Plan [40 Code of Federal Regulations (CFR) 300.415 (b) (2)] authorizes EPA to consider emergency response actions at those sites that pose an imminent threat to human health or the environment. For the following reasons, a referral to Region 9's Emergency Response Office does not appear to be necessary:

- The OCNB site consists of a VOC groundwater plume with known and unknown sources, but the contamination cannot be clearly attributed to any specific source. DTSC and RWQCB have been conducting investigation and remediation activities at nine possible source sites (see Section 2.3.2). However, vapor intrusion potential has not been evaluated at any of the known or suspected source facilities.

6.0 SUMMARY

The OCNB site is located in Orange County, California. The site consists of a volatile organic compound (VOC) groundwater plume covering approximately 5 square miles located northwest of the intersection of the CA-57 and CA-91 Freeways. Groundwater in the plume has been contaminated by chlorinated organic solvents from known and unknown industrial sources located in the Orange County North Basin area.

OCWD is a special district formed to manage the Orange County Groundwater Basin. Water from the overall basin provides approximately 70 percent of the water supply for 2.4 million Orange County residents. Through OCWD's groundwater monitoring program, they discovered the OCNB VOC plume. OCWD monitors the North Basin plume as part of their NGBPP. OCWD initiated the NGBPP in 2005 to minimize the spread of VOC contamination and clean up the groundwater in this portion of the basin.

Based on groundwater monitoring data, OCWD has concluded that VOCs are migrating into the North Basin's principal aquifer that is used for drinking water. To date, four drinking water production wells within the footprint of the existing plume have been destroyed because of contamination (two from the City of Fullerton, one from the City of Anaheim, and one private well).

The following pertinent Hazard Ranking System factors are associated with the site:

- The OCNB site consists of a VOC groundwater plume attributable to a number of sources. The VOC contamination has not been identified with any single source, but instead it has originated from several industrial sources located in the plume area, including multiple facilities that have had documented or suspected releases to groundwater.
- Based on the results of OCWD's NGBPP sampling program, it is projected that this release of hazardous substances to groundwater is reaching the principal drinking water aquifer.
- Two City of Fullerton wells, one City of Anaheim well, and one private well located within the plume already have been destroyed. Before their destruction, these wells had VOC concentrations exceeding Maximum Contaminant Levels (MCLs).
- There are at least 46 active drinking water production wells located within 4 miles of the plume. VOCs, including 1,1-dichloroethylene (1,1-DCE), TCE, and PCE, have been detected in several drinking water production wells.

7.0 REFERENCES

- Anaheim, 2015 City of Anaheim, Water Quality Report.
- BPWD, 2015 City of Buena Park Water Department, 2015 Water Quality Report.
- COWD, 2014 City of Orange Water Division, Consumer Confidence Report – 2014.
- EPA, 2016a U.S. Environmental Protection Agency, EPA Superfund Program, Superfund Public User Database, LIST-008R Active Site Status Report, Run date November 22, 2016.
- EPA, 2016b U.S. Environmental Protection Agency, Envirofacts Search Results, Orange County North Basin, <https://www3.epa.gov/enviro/facts/multisystem.html>, May 19, 2016.
- Fullerton, 2015 City of Fullerton Water, 2015 Water Quality Report.
- GeoTracker, 2016 Regional Water Quality Control Board; GeoTracker Database – Regulator Access, DPH Public Supply Well Search Results; in the vicinity of Fullerton, California; data extracted May 18, 2016.
- Note: This document is confidential and is included in the confidential information packet.*
- GSWC, 2015 Golden State Water Company, Placentia Water System, Consumer Confidence Report on Water Quality for 2014, 2015.
- Intera, 2015 Intera Geoscience & Engineering Solutions. 2015: Conceptual Model Refinement, North Basin Groundwater Modeling Project. February 18, 2015.
- Mark, 2016 Dave Mark, Orange County Water District, email to Kim Hoang, EPA, April 7, 2016.
- OCWD, 2015a Orange County Water District, 2015. Groundwater Management Plan, 2015 Update, June 17, 2015.
- OCWD, 2015b Orange County Water District, Water Resources Management System, Spreadsheet, Query: monwells_wq_01012012_11052015, Generated on November 18, 2015.
- OCWD, 2016 Orange County Water District, Water Resources Management System, Spreadsheet, Query:wq_approved_monitoring_10_01_2015_to_03_01_2016 Generated on March 9, 2016.

Sundance, 2017 Sundance Environmental and Energy Specialists, Ltd., Orange County North Basin Plume 3DVA Technical Memo, January 2, 2017.

Weston, 2016 Weston Solutions, Inc., Drinking Water Well Locations, Fullerton, Orange County, California, May 10, 2016.

Note: This document is confidential and is included in the confidential information packet.

YLWD, 2015 Yorba Linda Water District, 2015 Water Quality Report.

Appendix A: Latitude and Longitude Calculations Worksheet

Note: Worksheet was not completed, because latitude/longitude was obtained from reference OCWD, 2016.

Appendix B: Site Reconnaissance Interview and Observation Report/ Photographic Documentation

*Note: No Site Reconnaissance Interview and Observations Report/Photographic
Documentation was required for the completion of this report*

Appendix C: Contact Log and Contact Reports

CONTACT REPORT 1

AGENCY/AFFILIATION: Golden State Water Company		
DEPARTMENT: Placentia CSA		
ADDRESS/CITY: 500 Cameron Street, Placentia		
COUNTY/STATE/ZIP: Orange County, California, 92870		
CONTACT(S)	TITLE	EMAIL
Dawn White		Dawn.White@gswater.com
PERSON MAKING CONTACT: Kim Hoang		DATE: 2/11/2016
SUBJECT: Drinking water well information		
SITE NAME: Autonetics-Raytheon		EPA ID NO.: CAN000900337

Here is the information using 2015 supply production:

Placentia System	2015 AF	% of Total	2015 Population	Population by source
			48,643	
Bradford #3	270.6	4.5%		2,108
Bradford #4	1,248.6	20.9%		9,710
La Jolla #2	1,093.3	18.3%		8,601
Ruby #1	688.3	9.6%		4,403
Orangethrope #1	130.6	2.2%		1,018
OC #37 (Placentia)	2,434.3	40.7%		18,827
OC #68 (Placentia)	241.6	4.0%		1,878
Sub-Total	6,968.3			48,643

CONTACT REPORT 2

AGENCY/AFFILIATION: City of Orange		
DEPARTMENT: Water Division		
ADDRESS/CITY: 189 South Water Street, Orange		
COUNTY/STATE/ZIP: Orange County, California, 92866		
CONTACT(S)	TITLE	EMAIL
Robert C. Baehner	Assistant Water Manager	bbaehner@cityoforange.org
PERSON MAKING CONTACT: Kim Hoang		DATE:
SUBJECT: Drinking water well information		
SITE NAME: Vista Paint		EPA ID NO.: CAN000900358

Current population that we are using is 139,463. There are 15 active wells and one inactive well. The wells provide approximately 71.1% (20,371.7 AF) to the entire system, and imported surface water provides approximately 28.9% (8,271.5 AF) to the entire system.

The percent contributions for the four wells within the target limit are as follows:

Well 8 = 5%
Well 9 = 4%
Well 15 = 4%
Well 21 = 10%

Since the City's water system is almost completely integrated or intertied together, water from these wells could theoretically make it to just about all points in the system over time.

CONTACT REPORT 3

AGENCY/AFFILIATION: City of Buena Park		
DEPARTMENT: Utilities		
ADDRESS/CITY: 6955 Aragon Circle, Buena Park		
COUNTY/STATE/ZIP: Orange County, California, 90620		
CONTACT(S)	TITLE	EMAIL
Mike Grisso	Utilities Manager	mgrisso@buenapark.com
PERSON MAKING CONTACT: Kim Hoang		DATE: 2/17/2016
SUBJECT: Drinking water well information		
SITE NAME: Autonetics-Raytheon		EPA ID NO.: CAN000900337

The population of Buena Park is 82,767, and each well listed below is directly connected to the City's distribution system. At any given time (based on system demand) one or all of these wells could be pumping into the system. The production capacity of each well is shown below. Approximately 70 percent of the city's supply comes from our water wells.

BP-BOIS/1	2800 GPM
BP-CABA/1	1200 GPM
BP-FREE/1	1000 GPM
BP-HOLD/1	1400 GPM
BP-KNOT/1	1400 GPM
BP-LIND/1	2800 GPM
BP-SM/1	1200 GPM

Appendix D: Transmittal List

TRANSMITTAL LIST

Date: February 7, 2017
Site Name: Orange County North Basin
EPA ID No.: CAN000900251

A copy of the Preliminary Assessment Report for the above-referenced site should be sent to the following:

John Scandura
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

Nick Amini
Santa Ana Regional Water Quality Control Board
3737 Main Street, Suite 500
Riverside, CA 92501

Dave Mark
Orange County Water District
18700 Ward Street
Fountain Valley, CA 92708